Electronic Version
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Claims

[c1] What is claimed is:

1. A phase locked loop (PLL) system for generating an output signal according to a first reference signal, the output signal being used as a reference clock to write recording data on an optical medium, the PLL system comprising:

a clock generator receiving the first reference signal and a first frequency-divided signal to generate the output signal according to a phase difference between the first reference signal and the first frequency-divided signal;

a phase-shift detector generating a phase adjusting signal; and

a phase-controllable frequency divider connected to the clock generator and the phase-shift detector for dividing the frequency of the output signal by a frequency dividing ratio to generate the first frequency-divided signal and for receiving the phase adjusting signal to adjust thephase of the first frequency-divided signal.

[c2] 2. The PLL system of claim 1 wherein the phase-controllable frequency divider adjuststhe frequency dividing ratio according to the phase adjusting signal.

[c3] 3. The PLL system of claim 1 wherein the phase-controllable frequency divider comprises a counter for counting the outputsignal , and the phase-controllable frequency divider generates the first frequency-divided signal according to the count value.

[c4] 4. The PLL system of claim 3 wherein the phase-controllable frequency divider adjusts the count value according to the phase adjusting signal.

[c5] 5. The PLL system of claim 1 wherein the first reference signal is a wobble signal generated from the optical medium.

[c6] 6. The PLL system of claim 5 wherein the phase-shift detector comprises:
a frequency divider dividing the output signal to generate a second frequency-divided signal; and
a phase difference detector connected to the frequency divider for detecting a phase difference between the second frequency-divided signal and the wobble signal to generate the phase adjusting signal.

[c7] 7. The PLL system of claim 5 wherein the phase-shift detector comprises:
a first frequency divider dividing the output signal to generate a second frequency-divided signal;

a second frequency divider dividing the wobble signal to generate a third frequency-divided signal; and
a phase difference detector connected to the first and second frequency dividers for detecting a phase difference between the second frequency-divided signal and the third frequency-divided signal to generate the phase adjusting signal.

[c8] 8. The PLL system of claim 5 wherein the phase-shift detector detects a phase difference between the wobble signal and a recording synchronization signal synchronous to the recording data for generating the phase adjusting signal.

[c9] 9. The PLL system of claim 5 wherein the optical medium is a DVD-R/RW disk.

[c10] 10. The PLL system of claim 5 wherein the optical medium is a DVD+R/RW disk.

[c11] 11. The PLL system of claim 5 wherein the phase-shift detector comprises:
a frequency divider dividing the wobble signal to generate a second frequency-divided signal; and
a phase difference detector connected to the frequency divider for detecting a phase difference between the second frequency-divided signal and a recording synchro-

nization signal synchronous to the recording data to generate the phase adjusting signal.

[c12] 12. The PLL system of claim 5 wherein the optical medium is a DVD+R/RW disk, and the phase-shift detector comprises:
an ADIP sync detector generating an ADIP synchronization signal synchronous to the ADIP units of the optical medium;
a frequency divider for dividing the output signal to generate a second frequency-divided signal; and
a phase difference detector connected to the frequency divider and the ADIP sync detector for detecting a phase difference between the second frequency-divided signal and the ADIP synchronization signal to generate the phase adjusting signal.

[c13] 13. The PLL system of claim 5 wherein the optical medium is a DVD+R/RW disk, and the phase-shift detector comprises:
an ADIP sync detector generating an ADIP synchronization signal synchronous to the ADIP units of the optical medium; and
a phase difference detector connected to the ADIP sync detector for detecting a phase difference between the ADIP synchronization signal and a recording synchronization signal synchronous to the recording data to

generate the phase adjusting signal.

[c14] 14. The PLL system of claim 5 wherein the optical medium is a DVD-R/RW disk, and the phase-shift detector comprises:
a land-pre-pit (LPP) sync detector detecting LPP bits to generate an LPP synchronization signal;
a frequency divider dividing the output signal to generate a second frequency-divided signal; and
a phase difference detector connected to the frequency divider and the LPP sync detector for detecting a phase difference between the second frequency-divided signal and the LPP synchronization signal to generate the phase adjusting signal.

[c15] 15. The PLL system of claim 5 wherein the optical medium is a DVD-R/RW disk, and the phase-shift detector comprises:
a land-pre-pit (LPP) sync detector detecting LPP bits to generate an LPP synchronization signal; and
a phase difference detector connected to the LPP sync detector for detecting a phase difference between the LPP synchronization signal and a recording synchronization signal synchronous to the recording data to generate the phase adjusting signal.

[c16] 16. The PLL system of claim 5 wherein the phase-shift

detector comprises:
a physical address detector detecting a physical address on the optical medium; and
a position difference detector for detecting a position difference between the physical address and a logical address of the recording data to generate the phase adjusting signal.

[c17] 17. The PLL system of claim 5 wherein the phase-shift detector comprises:
a physical address detector detecting a physical address on the optical medium;
a logic address detector detecting a logical address of the recorded data on the optical medium; and
a position difference detector for detecting a position difference between the physical address and the logical address of the recorded data to generate the phase adjusting signal.

[c18] 18. A method for generating an output signal according to a first reference signal, the output signal being used as a reference clock to write recording data on an optical medium, the method comprising:
receiving the first reference signal and a first frequency-divided signal to generate the output signal according to a phase difference between the first reference signal and the first frequency-divided signal;

generating a phase adjusting signal;
dividing the frequency of the output signal bya frequency dividing ratio to generate the first frequency-divided signal; and
receiving the phase adjusting signal to adjust thephase of the first frequency-divided signal.

[c19] 19. The method of claim 18 further comprising:
adjusting the frequency dividing ratio according to the phase adjusting signal.

[c20] 20. The method of claim 18 further comprising:
counting the output signal to generate a count value, and generating the first frequency-divided signal according to the count value.

[c21] 21. The method of claim 20 further comprising:
adjusting the count value according to the phase adjusting signal.

[c22] 22. The method of claim 18 wherein the first reference signal is a wobble signal generated from the optical medium.

[c23] 23.The method of claim 22 wherein generating the phase adjusting signal comprises:
dividing the output signal to generate a second frequency-divided signal; and

detecting a phase difference between the second frequency-divided signal and the wobble signal to generate the phase adjusting signal.

[c24] 24. The method of claim 22 wherein generating the phase adjusting signal comprises:
dividing the output signal to generate a second frequency-divided signal;
dividing the wobble signal to generate a third frequency-divided signal; and
detecting a phase difference between the second frequency-divided signal and the third frequency-divided signal to generate the phase adjusting signal.

[c25] 25. The method of claim 22 wherein generating the phase adjusting signal comprises:
detecting a phase difference between the wobble signal and a recording synchronization signal synchronous to the recording data for generating the phase adjusting signal.

[c26] 26. The method of claim 22 wherein the optical medium is a DVD-R/RW disk.

[c27] 27. The method of claim 22 wherein the optical medium is a DVD+R/RW disk.

[c28] 28. The method of claim 22 wherein generating the

phase adjusting signal comprises:
dividing the wobble signal to generate a second frequency-divided signal; and
detecting a phase difference between the second frequency-divided signal and a recording synchronization signal synchronous to the recording data for generating the phase adjusting signal.

[c29] 29. The method of claim 22 wherein the optical medium is a DVD+R/RW disk, and generating the phase adjusting signal comprises:
generating an ADIP synchronization signal synchronous to the ADIP units of the optical medium;
dividing the output signal to generate a second frequency-divided signal; and
detecting a phase difference between the second frequency-divided signal and the ADIP synchronization signal to generate the phase adjusting signal.

[c30] 30. The method of claim 22 wherein the optical medium is a DVD+R/RW disk, and generating the phase adjusting signal comprises:
generating an ADIP synchronization signal synchronous to the ADIP units of the optical medium; and
detecting a phase difference between the ADIP synchronization signal and a recording synchronization signal synchronous to the recording data to generate the phase

adjusting signal.

[c31] 31. The method of claim 22 wherein the optical medium is a DVD-R/RW disk, and generating the phase adjusting signal comprises:
detecting LPP bits to generate an LPP synchronization signal;
dividing the output signal to generate a second frequency-divided signal; and
detecting a phase difference between the second frequency-divided signal and the LPP synchronization signal to generate the phase adjusting signal.

[c32] 32. The method of claim 22 wherein the optical medium is a DVD-R/RW disk, and generating the phase adjusting signal comprises:
detecting LPP bits to generate an LPP synchronization signal; and
detecting a phase difference between the LPP synchronization signal and a recording synchronization signal synchronous to the recording data for generating the phase adjusting signal.

[c33] 33. The method of claim 22 wherein generating the phase adjusting signal comprises:
detecting a physical address on the optical medium; and
detecting a position difference between the physical ad-

dress and a logical address of the recording data to generate the phase adjusting signal.

[c34] 34. The method of claim 22 wherein generating the phase adjusting signal comprises:
detecting a physical address on the optical medium;
detecting a logical address of the recorded data on the optical medium; and
detecting a position difference between the physical address and a logical address of the recorded data to generate the phase adjusting signal.